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be applied to lengthen life

[New York]

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Betterment of Life Insurance Service

CAN INSURANCE EXPERIENCE BE
APPLIED TO LENGTHEN LIFE

BY

ARTHUR HUNTER

Chairman Central Bureau Medico-Actuarial Mortality Investigation;
Actuary New York Life Insurance Company

Effect of alcoholic beverages, overeating,
undereating, social diseases and occupation
upon length of life, as disclosed by a
scientific investigation of 2,000,000 in-
sured lives.

An Address delivered at the Eighth Annual Meeting of
THE ASSOCIATION OF LIFE INSURANCE PRESIDENTS
at New York, December 10, 1914

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CAN INSURANCE EXPERIENCE BE APPLIED TO LENGTHEN LIFE?

By ARTHUR HUNTER

*Chairman Central Bureau Medico-Actuarial Mortality Investiga-
tion; Actuary New York Life Insurance Company*

AN ADDRESS DELIVERED AT THE EIGHTH ANNUAL MEETING OF THE
ASSOCIATION OF LIFE INSURANCE PRESIDENTS IN
NEW YORK CITY ON DECEMBER 10, 1914

I have stated my subject as a question, "Can insurance experience be applied to lengthen life?" and the answer is simple: It can. I have no doubt that the knowledge which the life insurance companies have acquired from their investigations regarding the mortality among their policyholders may be applied by individuals towards lengthening their own lives; but the difficulty arises of getting such information before the public in a form which can be readily understood. The investigations undertaken by the companies were primarily intended to assist them in determining which types of persons could safely be accepted for insurance at the regular rates of premium, which types should be charged an extra premium, and which should be declined. The purpose of the preparation of these statistics was not to excite public interest or curiosity, but for actual use in a great business. No haphazard methods have been used, but the most approved and scientific known to actuaries and medical directors; their knowledge of mortality is based upon the actual experience of companies with all sorts and conditions of men and women, and naturally appears in the form of statistics. Lest the word "statistics" should frighten you, let me point out that true progress in any science is made through recording the result of actual experience or of experiments, and that my statistics will be of this nature. They will constitute, in fact, a brief record of what has happened to mankind under certain conditions, and will not be difficult for the layman to follow.

Forty-three of the leading life insurance companies in the United States and Canada agreed in 1909 to prepare their collective experience on many different classes of insured. They decided to put the

investigation into the hands of the Actuarial Society of America and the Association of Life Insurance Medical Directors. The companies supplied their records on about 2,000,000 lives, covering a period of twenty-five years. It is the largest and most comprehensive investigation ever undertaken by insurance companies anywhere. The object of the investigation was to determine from past experience the types of lives among which the companies had a higher mortality than the average. The results of the investigation have appeared in four volumes, and the fifth is in press. It has taken the Central Bureau about three and a half years of continuous labor to produce the results, using the most up-to-date machinery in the way of electric sorters and tabulators. A card was supplied for each of the policies issued from the years 1885 to 1909 among certain types, the history of the person being given on such card.

The insured were divided into many classes, of which the following are the chief groups:

1. Those who were in *occupations* involving hazard;
2. Those who had a family history of consumption;
3. Those who had a defect in their personal history, such as an attack of appendicitis, renal colic, rheumatism, syphilis, etc.
4. Those whose physical condition was not normal, as shown by indications such as a high pulse, irregular pulse, albumen in urine, etc.;
5. Those whose habits with regard to alcoholic beverages were not satisfactory in the past, or who used liquor steadily at the time of application for insurance;
6. Those who were distinctly overweight or underweight.

It would be impossible to cover in a brief paper any but a very few of the important classes. Before describing these classes I should like to emphasize the fact that all the lives involved in the investigation had been carefully examined by competent physicians, and that, in general, the more hazardous the occupation, or the greater the defect in physical condition, in family history, or in personal history, the more care was taken in selecting the lives. For example, in the case of applicants who were 20 per cent. overweight insurance would be granted in the majority of cases, but among those of extreme overweight very few would be accepted, and these would be the best of their kind. In order to determine the relative mortality, a standard or "measuring rod" was prepared, representing average mortality among insured lives, based upon the experience of the forty-three companies among all their insured. It is not necessary to describe

this standard—merely to point out by an example the method of using it. When a class is said to have 10 per cent. extra mortality, it means that where the experience of the companies would have resulted in 100 deaths among their insured as a whole, there were 110 deaths in the specified class. Another way of making the needed comparison is by showing the number of years by which the average lifetime will be reduced, and this manner of exhibiting the degree of hazard will be used in some cases. In this connection it may be well to point out that a reduction in the average lifetime of say five years among a large group of men is a serious matter. It does not mean that five years is taken off the lifetime of only those who have reached age 65 or 70, but that the average lifetime of all men is reduced by five years. If in an occupation employing many men, such as mining, there were such a reduction, it would mean an economic waste in the United States equivalent to about five years of the lifetime of one million men, or a reduction of their productive lifetime by about one-sixth.

OCCUPATION.

There were 97 different occupations in which the relative mortality was determined. I shall here deal only with three groups of these occupations.

RAILROADS

One of the significant results of the investigation was the high mortality experienced among railroad men. Among locomotive engineers, for example, the mortality was 60 per cent. in excess of that experienced among the insured as a whole, which is equivalent to five years' reduction in the average lifetime. If these locomotive engineers had been in a non-hazardous occupation, there would have been about 337 deaths, and there were actually 541 among them. Such a death rate can be reduced, as is proved by the results of the splendid efforts being made by a number of the principal railroads to educate their employees to assist in keeping down the accident and death rates. Some of the leading railroads issue monthly pamphlets, showing the best manner of coupling cars, shutting off air brakes, etc. They publish lists of men who have done good work in reporting deficient couplings, defective rails, etc., which might lead to accident. These railroads impress upon the men in every way the necessity of safety for themselves, and the effect which care on their part is likely to have on the future of their families. As a result of this campaign there has been a great decrease in the number of deaths. During the first six months of 1914 there was a decrease

of one-third in the number of deaths among employees of one of the leading railroads over the corresponding period of 1913; and there was a decrease of one-quarter in the number of employees injured in the same period of 1914 as compared with the first six months of 1913. As in both of these years the company had in effect its plans for the safety of its employees, the above figures show that there is a continued improvement as the result of this campaign, and that the employees are learning to realize the advantages which accrue therefrom.

MINING INDUSTRY

One is also greatly impressed with the needless waste of life in connection with the mining industry. The mortality among working miners in all underground *metal* mines was more than double that among other insured lives. This is equivalent to an average reduction of fully nine years in their lifetime. If these men had been employed in non-hazardous occupations, there would have been about 280 deaths, while there were actually 642 deaths. More than 150 of these deaths were due to mining accidents. That a great reduction in the death rate from accident is possible may be inferred from the experience in corresponding occupations in Belgium, Germany and Great Britain.

Pneumonia and tuberculosis both cause a very high death rate among miners, and this can largely be prevented through systematic education and through co-operation between the employers and the miners' unions. Much can also be done in reducing the number of accidents in the mines by such co-operation.

Space prevents my taking up other classes of the mining industry, and I shall therefore only state that the mortality was high among all classes of miners, including foremen, both in underground and surface mines.

LIQUOR BUSINESS

There is a general impression that saloon keepers do not live as long as persons in non-hazardous occupations, but it is not generally known that most classes which are connected with either the manufacture or sale of liquor have a high mortality. Among saloon proprietors, whether they attended the bar or not, there was an extra mortality of 70 per cent.; and the causes of death indicated that a free use of alcoholic beverages had caused many of the deaths. The hotel proprietors who attended the bar either occasionally or regularly had as high a mortality as the saloon keepers, i. e., the lifetime was reduced about six years on the average

on account of their occupation. The mortality among those connected with breweries was about one-third above the normal. The large class of proprietors of wholesale liquor houses had an extra mortality of about one-fifth. In the fourteen subdivisions of the trades connected with the manufacture or sale of alcohol, there was only one class which had a normal mortality, and that was the distillery proprietors. The facts regarding the adverse effect on longevity of engaging in the liquor trade are such that, if they were generally known, young men who are easily tempted would be deterred from entering this business.

The high mortality in some of the occupations to which reference has been made must not be ascribed to the men having other defects, such as a tubercular family history. Where there was any defect in the physical condition, in the family record, in the habits of life, etc., the insured was not included in the investigation of the mortality of men in the occupation. In the same way, in investigating the mortality of insured with a defect in family record or personal condition, no men in hazardous occupations were included in the groups investigated.

DEFECTS IN PERSONAL OR FAMILY HISTORY

There were about 200 classes or groups investigated in which the insured had a defect in his physical condition, personal history, or family history. I shall refer only to a few of these in which the public are likely to be most interested.

SYPHILIS.

It has generally been assumed that syphilis increases the death rate, but no facts relating to this country have heretofore been published showing the serious effect of that disease on mortality. The forty-three companies accepted only the better type of cases with a history of syphilis. Taking all the cases in which the insured admitted having syphilis prior to the date of application for insurance, the companies had 274 deaths, while the normal mortality would have been about 153; that is to say, there was an extra mortality of about 80 per cent. due to that disease. The same results have been found in other countries. For example, among the men insured with the principal German company there were 487 deaths among those who had undergone treatment for syphilis, while there would have been only 290 deaths according to the experience of that company among all their insured lives; the excess mortality was therefore nearly 70 per cent. The only other

published investigation of which I am aware was that made by the Scandinavian companies, which showed a mortality as high as in the German company to which I have just referred. This is sufficient evidence of the bad effect of syphilis on the individual. It is hardly necessary to mention that, in addition to shortening men's lives, it shortens their period of activity while they are alive. Locomotor ataxia and softening of the brain are believed by medical men to be due to syphilis in the majority of cases.

It must not be assumed that the high mortality is due to the companies accepting cases which had not been properly treated for syphilis. One of the classes consisted of men who had had two years' continuous treatment, and one year's freedom from symptoms prior to acceptance by the insurance companies, yet the excess mortality was 80 per cent—a decreased lifetime of about six years. A disease which shortens the life and limits the activity of the individual, and which causes untold misery and suffering to the progeny, should be and can be banished by an intelligent public opinion.

HABITS AS TO ALCOHOLIC BEVERAGES

Nothing has been more conclusively proved than that a steady free use of alcoholic beverages, or occasional excesses, are detrimental to the individual. In my judgment, it has also been proved beyond peradventure of doubt that total abstinence from alcohol is of value to humanity; it is certain that abstainers live longer than persons who use alcoholic beverages. The low mortality among abstainers may not be due solely to abstinence from alcohol, but to abstinence from tobacco, and to a careful regard for one's physical well-being.

Among the men who admitted that they had taken alcohol occasionally to excess in the past, but whose habits were considered satisfactory when they were insured, there were 289 deaths, while there would have been only 190 deaths had this group been made up of insured lives in general. The extra mortality was, therefore, over 50 per cent., which was equivalent to a reduction of over four years in the average life of these men. If this meant that four years would be cut off the end of the average normal lifetime of each man, there are many who would consider that "the game was worth the candle"; but it means that in each year a number of men will die at an earlier age than they should. For example, at age 35, the expectation of life is 32 years: in the first year after that age, instead of, say, 9 persons dying, there would probably be 12 deaths; that is, three men would each lose 32 years

of life; in the next year probably four men would each lose 31 years of life, etc. As a matter of fact, many immoderate drinkers would live longer than 32 years, but not nearly so many as would live if they had been moderate drinkers, and far fewer than if they had been total abstainers from alcohol.

With regard to men who had used alcoholic beverages daily but not to excess, the experience of the companies was divided into two groups: (a) men who took two glasses of beer, or a glass of whiskey, or their equivalent, a day; (b) men who took more than the foregoing amount, but were not considered by the companies to drink to excess. The mortality in the second group was found to be fully 50 per cent. greater than in the first—an excellent argument for moderation in the use of alcoholic beverages. The foregoing result does not mean that the large excess mortality in Class (b) was due to their drinking a little more each day than those in Class (a). It is probable that among those who were very moderate users of alcoholic beverages there were comparatively few who eventually used liquor immoderately; but among those who took more than a glass of whiskey or its equivalent a day there were probably a goodly number who increased their daily consumption after having applied for insurance, and who eventually drank to an immoderate extent. Part of the hazard from alcoholic beverages lies in the user losing the power to limit himself to a moderate consumption.

Among the men whose habits were formerly intemperate but who had reformed for at least two years prior to their acceptance by the insurance companies, the extra mortality was fully 30 per cent.; i. e., their average lifetime was reduced by about three years. This excess mortality is partly due to the effect of previous intemperate habits in undermining the system and partly to a proportion of the persons relapsing into their old habits.

In the foregoing classes men who were in the liquor business, or in any other occupation involving hazard, were excluded.

The Committee of the Medico-Actuarial Mortality Investigation did not make a report on the mortality among total abstainers, but sufficient statistics have been published by individual companies to justify the statement that persons who have always been total abstainers have a mortality during the working years of life of about one-half of that among those who use alcohol to the extent of at least two glasses of whiskey per day. In view of this, the effect of prohibition of the manufacture and sale of alcoholic beverages in Russia must be very great. If the Government of Russia carry out their present intention to abolish permanently all forms of alcoholic

beverages, the saving in human life will be enormous. It is not too much to say that the loss of 500,000 men as the result of the present warfare could be made good in less than ten years through complete abstinence from alcoholic beverages by all the inhabitants of Russia. In the *New York Times* of November 19th a former member of the Duma, a man who has worked for prohibition in Russia for many years, Michael Demitrovitch Tehelischeff, states that already the results of the abstinence from vodka are seen in the peasants; "they are beginning to look like a different race." He states that in the factories the efficiency of the worker has greatly increased, that women and children who suffered from violence of the husband and father through his addiction to vodka "suddenly found themselves in an undreamed-of paradise. There were no blows, no insults, and no rough treatment. There was bread on the table, milk for the babies, and a fire in the kitchen."

PLEURISY

What may the public learn regarding such an apparently uninteresting subject as the death rate in an insurance company from pleurisy? They may learn that the deaths from tuberculosis of the lungs among persons who had had pleurisy within five years prior to insurance were three times the average number. The public should be told that an attack of pleurisy is followed in many cases by tuberculosis, and that, accordingly, after an attack of pleurisy every precaution should be taken to guard against infection from tuberculosis and against a run down condition which is favorable to that disease.

FAMILY RECORD OF TUBERCULOSIS

Twenty years ago it was believed that tuberculosis of the lungs was directly inheritable, and, accordingly, it was the custom of most companies to decline to grant insurance on applicants either of whose parents had died of tuberculosis of the lungs. After it was ascertained that tuberculosis was apparently due to contagion, the companies liberalized in their treatment. It was noted, however, that there was an excess mortality among persons with a family history of tuberculosis even when care was taken against contagion, and many physicians were led to believe that a predisposition to that disease could be inherited. In the latest investigations it has been feasible to make subdivisions with a view to determining the types of persons among whom the mortality had been high, and thereby to arrive, if possible, at the reasons for the apparent predisposition to tuberculosis. Among light weight men who had a parent die of

tuberculosis, the mortality was high at the younger ages, but normal at the older ages. It may be said, in general, that, except at young ages, the longevity of persons *above* the average weight is not affected by a family history of a parent dead from tuberculosis. The mortality among men who had a brother or a sister die of tuberculosis was not materially different from that among men who had a parent die from that disease.

Unfortunately, these statistics do not show definitely whether or not a predisposition to tuberculosis is hereditary, but it has been indicated that there is a predisposition to light weight, which is a condition favorable to the development of tuberculosis. Among young men who were, when insured, at least 25 pounds under the average weight, and who had a parent, brother or sister die from tuberculosis, out of every ten deaths five were due to tuberculosis. This is an appalling waste of life, which could be greatly decreased by proper care and sufficient nourishment. Among young men with the same family record of the disease, who were slightly overweight, three out of every ten deaths were from tuberculosis; while among those distinctly heavy, out of every ten deaths only one was from tuberculosis. A well-nourished man, taking reasonable precautions against contagion, has little to fear from tuberculosis. The lesson to be drawn by the community from the experience of the insurance companies is that the inhabitants should be well nourished in order to reduce the great economic waste which comes from tuberculosis. That this waste is very costly there can be no doubt. Dr. Hurty, the Indiana Health Commissioner, states that "the cost of preventable consumption to the people of Indiana is not less than ten million dollars a year."

Among persons who were very light in weight but who had *not* a family record of tuberculosis, the death rate from that disease was high.

During a time of war the dependents of those in the army and navy are looked after by their governments, although generally in an inadequate way; but in time of peace comparatively little attention is paid to the dependents of those afflicted with tuberculosis, frequently acquired as the result of conditions which the governments could prevent. There is unquestionably a great need for the state or the community providing means of subsistence for the families of the breadwinners under treatment for tuberculosis. As great a need also exists for suitable employment for those who have recently been cured of tuberculosis and who are not yet fitted for their regular occupation, or must change from indoor to outdoor work.

It is beginning to be recognized that the man or woman afflicted with tuberculosis should not be hindered from recovery by anxiety about the conditions of their dependents; but it is equally important that the breadwinner should not be required to take up hard or unsuitable work too soon after recovery, because a relapse means that the treatment must begin again with a discouraged patient.

INFLUENCE OF OVERWEIGHT ON MORTALITY

There is no doubt that marked overweight has a material effect in decreasing length of life, especially at the middle and older ages. For example, among men 40 pounds above the average weight the lifetime of those who entered the companies at age 45 was about four years less than that of men of normal weight. The public should understand that marked overweight is a serious handicap to length of life, and that the adage, "Laugh and grow fat," is not good advice for the man or woman who is inclined to be heavy. Diabetes, Bright's disease, heart disease and apoplexy cause a large proportion of the deaths among the overweights. While the over-eater is not such a bad social influence as the excessive drinker, the former is also shortening his life by lack of moderation.

In conclusion it should perhaps be stated that the statistics of the Medico-Actuarial Mortality Investigation were not compiled with intent to prove or disprove a particular theory, as so frequently happens when partisans engage in the preparation of statistics in support of their point of view. The companies put their records in the hands of a committee of actuaries and medical directors and asked them to determine what the true experience had been. The statistics, therefore, represent the facts.

This investigation shows effects of incorrect living and frequently indicates the way in which improvement may be made. The officers of the companies are glad to have such information given to the public, since they know it will be of direct benefit in reducing the death rate and because they are interested also in such matters from the standpoint of the general welfare.

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- Group Insurance—Its Aims and Its Field. By William A. Day, President, Equitable Life Assurance Society. December, 1913.
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Copies of any of above will be mailed upon request.

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- The Social Engineer in the Field of Public Health. By Luther H. Gulick, M.D., Director, Department of Child Hygiene, Russell Sage Foundation. December, 1911.
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- *Report of the Life Extension Committee of the Association of Life Insurance Presidents. December, 1910.
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- *The Work of the Census in Vital Statistics. By Cressy L. Wilbur, M.D., Chief Statistician, Bureau of Vital Statistics, United States Census Bureau. December, 1910.
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- Economic Aspect of Lengthening Human Life. By Professor Irving Fisher, President of the Committee of One Hundred on National Health. February, 1909.
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